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# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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April 17, 2012

TO: Internal File

THRU: Steve Christensen, Permit Supervisor/Team Lead SC

FROM: Ken Hoffman, Environmental Scientist/Hydrology KH

RE: Construction of Burma Evaporation Basin, Genwal Resources, Inc., Crandall Canyon Mine, C/015/0032, Task #3997

### SUMMARY:

This Significant Revision to the Mining and Reclamation plan was received on January 12, 2012. The amendment details 7.32 acres of additional disturbed area (Chap. 1, p. 1-9) in T 17 S, R 8 E Section 5 within Lot 6 (see Plate 1-1). The additional disturbance will be on SITLA land under a 30 year lease (Special Use Lease Agreement 1708, Appendix 1-16). The evaporation basin will be approximately 200 ft long x 100 ft. wide x 6 ft. deep, to be constructed as described in Appendix 7-66. Using the Permittee's estimates, of 1.5 inch accumulation per year, the life of this facility is twenty four years, at which time the dried waste will be at the design maximum of 36 inches, leaving 24 inches of freeboard (Chap. 5). (As stated in the plan there is room for expansion to the east and west.) The waste will be covered with 48 inches of soil.

Appendix 7-66 of the application contains a brief description of hydrology as well as Attachment 7 on sedimentation and drainage control. The application covers source sampling, existing drainage topography, nearby surface water bodies, disturbed area runoff control, precipitation control, and sediment control measures. However the application includes numerous deficiencies. The application is not recommended for approval until the following issues are resolved:

**R645-301-722.2:** The application shall also include language the Permittee has fulfilled all requirements of the Department of Environmental Quality in relation to a Utah Pollutant Discharge Elimination System (UPDES) permit. (KH)

**R645-301-722.300 & 400:** The Permittee shall provide a map showing the locations used to gather baseline data and the location and depth of water wells surrounding the site or add a note to Drawing 3 that no water wells are located within a certain radius. (KH)

**R645-301-724:** The Permittee shall submit baseline groundwater and surface water data as part of the application. (KH)

**R645-301-724.100:** The Permittee shall include the location and ownership for the permit and adjacent areas of the existing wells, springs and other ground-water resources, with seasonal quality and quantity of ground water, and usage. (KH)

**R645-301-724.200:** The Permittee shall include the name, location, ownership, and description of all surface water bodies within the proposed permit and adjacent areas and information on surface-water quality and quantity. (KH)

**R645-301-724.310:** The Permittee shall determine the extent to which a ground-water monitoring plan is necessary and discuss the determination in the application. (KH)

**R645-301-724.310:** The Permittee shall determine the extent to which a surface monitoring plan is necessary and discuss the determination in the application. (KH)

**R645-301-724.310L:** The Permittee shall include a determination that the evaporation basin will never discharge to surface water by way of infiltration. (KH)

**R645-301-724.320:** The Permittee shall provide a determination that the proposed reclamation will prevent material damage to the hydrologic balance outside the permit area. (KH)

**R645-301-724.400:** The Permittee shall include climatological factors including: the average seasonal precipitation; the average evaporation rates, the average direction and velocity of prevailing winds; and, seasonal temperature ranges. (KH)

**R645-301-728:** The Permittee shall conduct a complete probable hydrologic consequences (PHC) determination. The PHC shall particularly evaluate the existing groundwater resources and concentration of metals. (KH)

**R645-301-728.320:** The Permittee must evaluate whether the dried product is a toxic-forming material which could result in ground-water contamination. (KH)

**R645-301-731:** The Permittee shall list all State-appropriated water rights located within the proposed permit area in addition to those located adjacent to the proposed permit area that may be impacted by the project. The listing shall include the water right number, location, quantity, and beneficial use. (KH)

**R645-301-731:** The Permittee must provide a plan for use of an engineered cover; or removal of the solids and liner shall be added to address possible underground ponding due to use on an engineered liner. (KH)

**R645-301-731.710:** The Permittee shall include the locations of water-supply intakes for current users of surface waters flowing into, out of, and within a hydrologic area, and those surface waters which will receive discharges from affected areas in the proposed permit area. (KH)

**R645-301-742.225.2:** The Permittee shall include language committing to retaining the capacity for a 100-year 24-hour storm event at all times. (KH)

**R645-301-743.130:** The Permittee must provide a spillway design for the proposed evaporation basin (i.e. either a combination of principal and emergency or a single spillway that meets the requirements of R645-301-743.131, -743.131.1, or -743.131.2). (KH)

**R645-301-745.111:** The Permittee shall use an engineered liner for protection of ground-water from leachate and additional sampling shall be conducted to evaluate the dried fill to evaluate long term leaching parameters. (KH)

**R645-301-746.221:** Language will be added to the description and narrative to establishment of suitable vegetation upon reclamation. (KH)

**R645-301-746.340** The Permittee shall include a method by which to field evaluate the remaining freeboard to confirm that the 100-year 24-hour capacity is remaining. The Permittee shall include an inspection program for use during months with precipitation to confirm the 100-year 24-hour capacity is remaining. The Permittee shall include a cleanout plan to be used at any time the capacity is less than the 100-year 24-hour storm event. The cleanout plan must include liquids removal and solids removal as either maybe required during the life of the basin. (KH)

**R645-301-760, -761, -762.100, -762.200, -763, -764 and -765:** The Permittee must address the Reclamation requirements relative to hydrology. (KH)

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**TECHNICAL ANALYSIS:**

**ENVIRONMENTAL RESOURCE INFORMATION**

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

**GENERAL**

Regulatory Reference: 30 CFR 779.11, 779.12, 783.12; R645-301-411, -301-521, -301-721.

**Analysis:**

Chapter 4 of the application includes a description of the general pre-mining conditions at the site.

**CLIMATOLOGICAL RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 779.18, 783.18; R645-301-724.

**Analysis:**

The application does not include climatological factors such as: the average seasonal precipitation; the average evaporation rates, the average direction and velocity of prevailing winds; and, seasonal temperature ranges. This information must be included.

**Finding:**

**R645-301-724.400**The Permittee shall include climatological factors including: the average seasonal precipitation; the average evaporation rates, the average direction and velocity of prevailing winds; and, seasonal temperature ranges.

**HYDROLOGIC RESOURCE INFORMATION**

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

**Sampling and Analysis**

**Analysis:**

The application includes results of sampling the influent slug slurry and the UPDES discharge from the Crandall Mine iron treatment facility. Source samples were collected and analyzed by appropriate methods.

### **Baseline Information**

#### **Analysis:**

Baseline hydrologic and geologic for cumulative impact area was not provided by the applicant. The application shall include baseline hydrologic information for local groundwater and surface water or document valid rational why it is not necessary. In addition, the applicant shall submit the probable cumulative hydrologic impacts of the proposed operation.

#### **Finding:**

**R645-301-724** The Permittee shall submit baseline groundwater and surface water data as part of the application.

### **Probable Hydrologic Consequences (PHC)**

#### **Analysis:**

A PHC for the new permit area was not included in the application. A PHC must be conducted so it can be determined which regulations protecting surface and/or ground water can be determined to be applicable. The PHC must address the possibility of metals, in particular iron and aluminum, leaching into the local groundwater.

#### **Finding:**

**R645-301-728** The Permittee shall conduct a complete probable hydrologic consequences (PHC) determination. The PHC shall particularly evaluate the existing groundwater resources and concentration of metals.

## **MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION**

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

### **Well Maps**

#### **Analysis:**

The application provides maps showing the Crandall mine lease area and regional site location in reference to the Crandall mine and figures showing the layout of the evaporation pond and includes the location of gas wells in the adjacent area but does not include depths. The

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map is stamped by a registered professional engineer. No map shows the locations of water wells surrounding the site.

**Findings:**

**R645-301-722.300 & 400** The Permittee shall provide a map showing the locations used to gather baseline data and the location and depth of water wells surrounding the site or add a note to Drawing 3 that no water wells are located within a certain radius.

**R645-301-724.100** The Permittee shall include the location and ownership for the permit and adjacent areas of the existing wells, springs and other ground-water resources, with seasonal quality and quantity of ground water, and usage.

**Monitoring and Sampling Location Maps**

**Analysis:**

The application does not include maps showing the elevations and locations of monitoring stations used to gather data on water quality and quantity.

**Finding:**

**R645-301-724.200** The Permittee shall include the name, location, ownership, and description of all surface water bodies within the proposed permit and adjacent areas and information on surface-water quality and quantity.

**Subsurface Water Resource Maps**

**Analysis:**

Underground mining will not be conducted so subsurface water will not be encounter as part of the project.

**Surface and Subsurface Ownership Maps**

**Analysis:**

All boundaries of lands and names of present owners of record of those lands, both surface and subsurface, included in or contiguous to the permit area. Drawing 2 - Surface ownership addresses this requirement. A Subsurface ownership map is not necessary as no underground mining will occur with this project.

## **Surface Water Resource Maps**

### **Analysis:**

The application does not include the locations of water-supply intakes for current users of surface waters flowing into, out of, and within a hydrologic area, and those surface waters which will receive discharges from affected areas in the proposed permit area. The application does include the location of surface water bodies such as streams, lakes, ponds, springs, constructed or natural drains, and irrigation ditches within the proposed permit and adjacent areas.

### **Finding:**

**R645-301-731.710** The Permittee shall include the locations of water-supply intakes for current users of surface waters flowing into, out of, and within a hydrologic area, and those surface waters which will receive discharges from affected areas in the proposed permit area.

## **OPERATION PLAN**

### **SUBSIDENCE CONTROL PLAN**

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

No subsidence will be present.

## **ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES**

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

### **Plans and Drawings**

### **Analysis:**

The plan includes the required hydrologic elements for road system plans and drawings including diversion of the natural drainage around the disturbed area.

### **Performance Standards**

### **Analysis:**

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The plan includes sediment control structures on each altered drainage channel as well as sediment control on the down gradient slopes. The plan includes the required hydrologic elements for road system performance standards.

### SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

#### Analysis:

The application does not include analysis of the dried evaporation basin solids and does not include analysis of possible leachate from the fill material. Sampling shall be conducted to evaluate the dried end product and to evaluate long term leaching parameters.

During the public comment period a comment was received from the Utah Department of Environmental Quality-Division of Drinking Water stating:

“There are no known drinking water sources in the immediate vicinity of the proposed project. However, to protect ground water quality, it is recommended that any such evaporation ponds be lined to prevent discharges into the subsurface.”

The Division agrees with the Division of Drinking Water’s assessment that for protection of ground-water quality that the evaporation ponds shall be lined to prevent discharge into the subsurface.

#### Finding:

**R645-301-745.11** The Permittee shall use an engineered liner for protection of ground-water from leachate and additional sampling shall be conducted to evaluate the dried fill to evaluate long term leaching parameters.

### HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

#### Groundwater Monitoring

#### Analysis:



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No groundwater monitoring program is proposed in the application. In accordance with the probable cumulative hydrologic impacts and PHC the Permittee shall layout an appropriate groundwater monitoring program. If the operator believes no program is necessary then the operator needs to utilize sound engineering practices to demonstrate that impacts to groundwater are not possible.

**Finding:**

**R645-301-724.310** The Permittee shall determine the extent to which a ground-water monitoring plan is necessary and discuss the determination in the application.

**Surface Water Monitoring**

**Analysis:**

No surface water monitoring plan is proposed in the application. In accordance with the probable cumulative hydrologic impacts and PHC the Permittee shall layout an appropriate surface monitoring program. Further the evaporation basin design does not include an outfall and the application states the basin includes design capacity to handle the 10-year 24-hour rainfall event as required by SMACRA. The Division currently lacks sufficient information and operational methods to determine no impacts will be made to surface water. The operator shall either develop a surface water monitoring plan or better demonstrate that no impacts will occur to surface water.

In order to omit a surface water monitoring plan the operator shall demonstrate through sound engineering practices that impacts to surface water are not possible. One Division concern is due to build up of sediment in the basin and back to back storm events during periods of zero evaporation that the basin might discharge. The operator shall include in the application a plan to observe and evaluate the basin after periods of significant rainfall. The observation and evaluation plan shall include at what point dewatering and/or cleanout of the basin are necessary to preclude any discharge. The application shall also include a determination that evaporation basin will never discharge to surface water by way of infiltration.

The application shall also include language the Permittee has fulfilled all requirements of the Department of Environmental Quality to not require an Utah Pollutant Discharge Elimination System (UPDES) permit or the Permittee shall obtain an UPDES permit.

**Finding:**

**R645-301-724.310** The Permittee shall determine the extent to which a surface monitoring plan is necessary and discuss the determination in the application.

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**R645-301-724.310** The Permittee shall include a determination that evaporation basin will never discharge to surface water by way of infiltration.

**R645-301-722.2** The application shall also include language the Permittee has fulfilled all requirements of the Department of Environmental Quality in relation to an Utah Pollutant Discharge Elimination System (UPDES) permit.

**State-Appropriated Water Rights**

**Analysis:**

The application does not include document of the location and ownership of adjacent areas water resources including State-appropriated water rights ownership, quality, and quantity. The application shall list all State-appropriated water rights located within the proposed permit area in addition to those located adjacent to the proposed permit area that may be impacted by the project. The listing shall include the water right number, location, quantity, and beneficial use. Water right information shall be obtained from the Utah Division of Water Right's (DWRi) database.

**Finding:**

**R645-301-731** The Permittee shall list all State-appropriated water rights located within the proposed permit area in addition to those located adjacent to the proposed permit area that may be impacted by the project. The listing shall include the water right number, location, quantity, and beneficial use.

**Acid- and Toxic-Forming Materials and Underground Development Waste**

**Analysis:**

The application proposes to reclaim the site by replacement of excavated fill material to a depth of 48" but does not discuss this will be sufficient for protect the accumulated sludge from infiltration of precipitation. The operator must either demonstrate that the reclaimed site will not leach iron and aluminum to the ground water or surface water or shall demonstrate that the fill material being used will preclude leaching from occurring by precipitation and infiltration.

**Finding:**

**R645-301-728.320** Evaluate whether the dried product is a toxic-forming material which could result in ground-water contamination.

### **Transfer of Wells**

#### **Analysis:**

There are no wells in the application.

### **Water-Quality Standards And Effluent Limitations**

#### **Analysis:**

If a UPDES permit is determined to be needed sampling and effluent limitation shall be included.

### **Diversions and Stream Buffer Zones**

#### **Analysis:**

No diversions or stream buffer zones will be required as part of the application.

### **Sediment Control Measures, Siltation Structures and Discharge Structures**

#### **Analysis:**

The application includes sufficient sediment control measures for the intended operations in the impacted areas. No sedimentation basins are proposed or required for the application. The project will not have any substantial discharge from the project area.

### **Impoundments**

#### **Analysis:**

The design was certified by a registered professional engineer. However, no spillway is included in the design but states that from experience at the Wildcat Loadout facility the design is of sufficient capacity to evaporate and contain anticipated storms. The Division requires a single-open channel emergency spillway complying with R645-301-743.131.

The applicant does not sufficiently demonstrate that during the overcast cold periods experienced at the facility during which the evapotranspiration rate is likely zero for possibly months at a time that the facility will have capacity for buildup of sediment and cleanout liquids. In addition, since the facility does not have a known closure date, it should be anticipated that at some point the basin will fill with sediment and require cleanout of solids and/or liquids.

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Since the facility is never intended to or designed to discharge the Division requires capacity maintained at all times for a 100-year 24-hour storm event. Second, the Division requires a method by which to field evaluate the remaining freeboard to confirm that the 100-year 24-hour capacity is remaining. Third, the Division requires an inspection program be included with the application for months with precipitation to confirm the 100-year 24-hour capacity is remaining. Last, the Division requires a cleanout plan to be used at any time the capacity is less than the 100-year 24-hour storm event. The cleanout plan must include liquids removal and solids removal as either maybe required during the life of the basin.

**Finding:**

**R645-301-743.130:** The Permittee must provide a spillway design for the proposed evaporation basin (i.e. either a combination of principal and emergency or a single spillway that meets the requirements of R645-301-743.131, -743.131.1, or -743.131.2). (KH)

**R645-301-742.225.2** The Permittee shall include language committing to the retaining the capacity for a 100-year 24-hour storm event at all times.

**R645-301-746.340** The Permittee shall include a method by which to field evaluate the remaining freeboard to confirm that the 100-year 24-hour capacity is remaining. The Permittee shall include an inspection program for use during months with precipitation to confirm the 100-year 24-hour capacity is remaining. The Permittee shall include a cleanout plan to be used at any time the capacity is less than the 100-year 24-hour storm event. The cleanout plan must include liquids removal and solids removal as either maybe required during the life of the basin.

## RECLAMATION PLAN

### GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

**Analysis:**

General discussion of the premining and postmining land use of grazing is included in the application. However, the application does not adequately explain how the facility will be returned to a premining state. As required by the SITLA lease the application shall include language about establishment of suitable vegetation, control of noxious weeds and pests. Also

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the description shall discuss restoring the natural drainage patterns upon reclamation. The legal record of ownership of the land is included in the application.

### Finding:

**R645-301-746.221** Language will be added to the description and narrative to establishment of suitable vegetation upon reclamation.

**R645-301-762.100** Language will be added to the description and narrative to include restoring the natural drainage patterns upon reclamation.

## ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

### Analysis:

Project will use existing roads so this is not relevant.

## HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

### Hydrologic Reclamation Plan

### Analysis:

The extent of the hydrologic reclamation plan is to place 4 feet of soil on top of the dry waste. Due to the requirement for use of liner the possibility for underground ponding is likely and must be mitigated. Before burying with 4 feet of soil the evaporation basin solids and liner shall be removed or an engineered cover shall be place over the solids and liner.

### Finding:

**R645-301-724.320** The Permittee shall provide a determination that the proposed reclamation will prevent material damage to the hydrologic balance outside the permit area.

**R645-301-731** A plan for use of an engineered cover or removal of the solids and liner shall be added to address possible underground ponding due to use on an engineered liner.

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**RECOMMENDATIONS:**

The application is not recommended for approval until the issues identified in this memo are resolved.

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